

>human SULF1 full length cDNA (ORF highlighted in capitals)

ccaccaccatcatctaaagaagataaacttggcgaatgacatgcaggttcttcaaggcagaataattgcagaaaatcttcaaa
ggaccctatctgcagatgttctgaatacctctgagaatagagattgattatcaaccaggatacctaattcaaggactccagaaat
caggagacggagacatttgtcagtttgcacattggaccaaaaatacaATGAAGTATTCTTGCTGTGCTCTGG
TTTTGGCTGTCCTGGGCACAGAATTGCTGGGAAGCCTCTGTTGACTGTGAGATCCCC
GAGGTTTCAGAGGACGGATACAGCAGGAACGAAAAACATCCGACCCAACATTATTCTTG
TGCTTACCGATGATCAAGATGTGGAGCTGGGGTCCCTGCAAGTCATGAACAAAACGAG
AAAGATTATGGAACATGGGGGGGCCACCTTCATCAATGCCTTTGTGACTACACCCATGT
GCTGCCCCGTCACGGTCCCTCCATGCTCACCGGGAAGTATGTGCACAATCACAATGTCTA
CACCAACAACGAGAAGTCTCTTCCCCCTCGTGGCAGGCCATGCATGAGCCTCGGACT
TTTGCTGTATATCTTAACAACACTGGCTACAGAACAGCCTTTTTTGGAAAATACCTCAATG
AATATAATGGCAGCTACATCCCCCTGGGTGGCGAGAATGGCTTGGATTAATCAAGAATT
CTCGCTTCTATAATTACACTGTTTGTGCAATGGCATCAAAGAAAAGCATGGATTTGATTA
TGCAAAGGACTACTTCACAGACTTAATCACTAACGAGAGCATTAACTTCAAAATGTCT
AAGAGAATGTATCCCCATAGGCCCGTTATGATGGTGATCAGCCACGCTGCGCCCCACG
GCCCCGAGGACTCAGCCCCACAGTTTTCTAAACTGTACCCCAATGCTTCCCAACACATA
ACTCCTAGTTATAACTATGCACCAAATATGGATAAACACTGGATTATGCAGTACACAGGAC
CAATGCTGCCCATCCACATGGAATTTACAAACATTCTACAGCGCAAAAGGCTCCAGACT
TTGATGTCAGTGGATGATTCTGTGGAGAGGCTGTATAACATGCTCGTGGAGACGGGGG
AGCTGGAGAATACTTACATCATTTACACCGCCGACCATGGTTACCATATTGGGCAGTTTG
GACTGGTCAAGGGGAAATCCATGCCATATGACTTTGATATTGCTGTGCCTTTTTTTTATTC
GTGGTCCAAGTGTAGAACCAGGATCAATAGTCCACAGATCGTTCTCAACATTGACTTG
GCCCCACGATCCTGGATATTGCTGGGCTCGACACACCTCCTGATGTGGACGGCAAGT
CTGTCTCAAACCTTCTGGACCCAGAAAAGCCAGGTAACAGGTTTCGAACAAACAAGAA
GGCCAAAATTTGGCGTGATACATTCTAGTGGAAAGAGGCAAATTTCTACGTAAGAAGG
AAGAATCCAGCAAGAATATCCAACAGTCAAATCACTTGCCCAAATATGAACGGGTCAA
GAACTATGCCAGAGGCCAGGTACCAGACAGCCTGTGAACAACCGGGGCAGAAGTGG
CAATGCATTGAGGATACATCTGGCAAGCTTCGAATTCACAAGTGTAAAGGACCCAGTGA
CCTGCTCACAGTCCGGCAGAGCACGCGGAACCTCTACGCTCGCGGCTTCCATGACAA
AGACAAAGAGTGCAGTTGTAGGGAGTCTGGTTACCGTGCCAGCAGAAGCCAAAGAAAG
AGTCAACGGCAATTCTTGAGAAACCAGGGGACTCCAAAGTACAAGCCCAGATTTGTCC
ATACTCGGCAGACACGTTCTTGTCCGTCGAATTTGAAGGTGAAATATATGACATAAATC
TGGAAGAAGAAGAAGATTGCAAGTGTTGCAACCAAGAAACATTGCTAAGCGTCATGAT
GAAGGCCACAAGGGGGCCAAGAGATCTCCAGGCTTCCAGTGGTGGCAACAGGGGCAG
GATGCTGGCAGATAGCAGCAACGCCGTGGGCCACCTACCACTGTCCGAGTGACACA
CAAGTGTTTTATTCTTCCCAATGACTCTATCCATTGTGAGAGAGAAGTGTACCAATCGGC
CAGAGCGTGGAAGGACCATAAGGCATACATTGACAAAGAGATTGAAGCTCTGCAAGATA
AAATTAAGAATTTAAGAGAAGTGAGAGGACATCTGAAGAGAAGGAAGCCTGAGGAATGT
AGCTGCAGTAAACAAAGCTATTACAATAAAGAGAAAGGTGTAAAAAGCAAGAGAAATTA
AAGAGCCATCTTCACCCATTCAAGGAGGCTGCTCAGGAAGTAGATAGCAAACCTGCAACT
TTTCAAGGAGAACAACCGTAGGAGGAAGAAGGAGAGGAAGGAGAAGAGACGGCAGAG
GAAGGGGGAAGAGTGCAGCCTGCCTGGCCTCACTTGCTTCACGCATGACAACAACCA
CTGGCAGACAGCCCCGTTCTGGAACCTGGGATCTTTCTGTGCTTGCACGAGTTCTAAC
AATAACACCTACTGGTGTTTTCGTACAGTTAATGAGACGCATAATTTTCTTTTCTGTGAGT
TTGCTACTGGCTTTTTGGAGTATTTTATATGAATACAGATCCTTATCAGCTCACAAATAC
AGTGACACCGGTAGAACGAGGCATTTTGAATCAGCTACACGTACAATAATGGAGCTCA
GAAGCTGTCAAGGATATAAGCAGTGCAACCCAAGACCTAAGAATCTTGATGTTGGAAAT
AAAGATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGGATGGATGGGAAGGTT

FIG. 1Ai

AAAtcagccccgtctcactgcagacatcaactggcaaggcctagaggagctacacagtgtgaatgaaaacat
ctatgagtacagacaaaactacagacttagtctggtggactggactaattacttgaaggatttagatagagtattt
gcactgctgaagagtcactatgagcaaaaataaaacaaataagactcaaactgctcaaagtgcgggttcttg
gtgtctctgctgagcacgctgtgtcaatggagatggcctctgctgactcagatgaagaccaaggcataaggt
tgggaaaacacctcatttgaccttgccagctgaccttcaaaccctgcatttgaaccgaccaacattaagtccag
agagttaaacttgaatggaataacgacattccagaagftaatcatttgaattctgaacactggagaaaaaccga
aaaatggacggggcatgaagagactaatcatctggaaaccgatttcagtggcgatggcatgacagagctag
agctcggggcccagccccaggctgcagccattcgaggcaccgaaagaacttcccagtatggtggtcct
ggaaaggacattttgaagatcaactatatcttctgtgcatccgatggaaattcagttcatcagatgttaccatg
gccaccgcagaacaccgaagtaattccagcatagcggggaagatgttgaccaagggtggagaagaatcac
gaaaaggagaagtcacagcacctagaaggcagcgctcctctcactctcctctgattagatgaaactgttac
cttaccctaaacacagatatttctttaactttttatttgaactaataaaggtaatcacagccaccaacattccaa
gctaccctgggtaccttgtgcagtagaagctagtgcagcatgtgagcaagcgggtgtgcacacgggagactcatc
gttataattactatctgccaagagtagaaagaaaggctggggatattgggtggcttgggtttgattttgtgttt
gtttgtttgtactaaaacagtattatctttgaatcgttagggacataagtatatacatgttatccaatcaagatgg
ctagaatggtgccttctgagtgtctaaaactgacacccctggtaaatcttcaacacacttccactgcctgcgta
atgaagtttgattcattttaaccactggaattttcaatgccgtcatttcagttagatgatttgcactttgagattaa
aatgccatgtctatttgattagcttattttttttttacaggcttatcagtcctcactgttggtgtcattgtgacaaagt
caaataaaccccccaaggacgacacacagtatggatcacatattgtttgacattaagcttttgccagaaaatgtt
gcatgtgtttacctcgacttgcataaatcgattagcagaaaggcatggctaataatgttgggtgggtaaaaataaat
aaataagtaaacaaaatgaagattgctgctctctctgtgcctagcctcaaagcgttcatacatcatcaccttt
aagattgctatatttgggttattttctgacaggagaaaaagatctaaagatctttttttcatctttttgttttcttg
catgactaagaagcttaaatgttgataaaatatgactagtttgaatttacaccaagaacttctcaataaaagaa
aatcatgaatgtccacaatttcaacataccacaagagaagtaatttcttaacattgtgttctatgattattttaa
gaccttcaccaagttctgatatcttttaagacatagttcaaaattgctttgaaaaatctgtattcttgaataatcctt
gttgtgtattagggttttaataaccagctaaaggattacctcactgagtcacagtacccctctattcagctcccaa
gatgatgtgttttgcctaccctaagagagggttttcttctatttttagataattcaagtgccttagataaattatgtttctt
aagtgttatggtaaactcttttaagaaaaattaatatgttatagctgaatcttttggttaactttaaatctttatcatag
actctgtacatatgttcaaattagctgcttgcctgatgtgtgtatcatcgggtgggatgacagaacaaacatatttat
gatcatgaataatgtgctttgtaaaaagattcaagttataggaagcactctgttttttaatcatgtataatattcc
atgatacttttatagaacaattctggcttcaggaaagtctagaagcaatatttcttcaataaaaagggtgtttaactt
taaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

FIG. 1A ii

>human SULF1 amino acid sequence--translation of ORF
MKYSCCALVLAVLGTELLGSLCSTVRSRFRGRIGQERKNIRPNIIILVLTDDQDVELG
SLQVMNKTRKIMEHGGATFINAFVTTTPMCCPSRSSMLTGKYVHNHNVTNNENCS
SPSWQAMHEPRTFAVYLNNTGYRTAFFGKYLNEYNGSYIPPGWREWLGLIKNSRF
YNYTVCRNGIKEKHGFDYAKDYFTDLITNESINYFKMSKRMYPHRPVMMVISHAAP
HGPEDSAPQFSKLYPNASQHITPSYNYAPNMDKHWIMQYTGPMPLPIHMEFTNILQR
KRLQTLMSVDDSVRLYNMLVETGELENTYIIYTADHGYHIGQFGLVKGKSMPYDF
DIRVPFFIRGPSVEPGSIVPQIVLNIDLAPTILDIAGLDTPPDVDGKSVLKLLDPEKPG
NRFRTNKKAKIWRDTFLVERGKFLRKKEESSKNIQQSNHLPKYERVKELCQQARY
QTACEQPGQKWQCIEDTSGKLRIHKCKGPSDLLTVRQSTRNLYARGFHDKDKECS
CRESGYRASRSQRKSQRQFLRNQGTPTYKPRFVHTRQTRSLSVFEFEGEIIDINLE
EEEEELQVLQPRNIAKRHDEGHKGPRDLQASSGGNRGRMLADSSNAVGPPPTTVRV
THKCFILPNDSIHCERELYQSARAWKDHKAYIDKEIEALQDKIKNLREVRGHLKRRK
PEECSCSKQSYYNKEKGVKKQEKLKSHLHPFKEAAQEVD SKLQLFKENRRRRKKE
RKEKRRQRKGEECSLPGLTCFTHDNNHWQTAPFWNLGSFCACTSSNNNTYWCL
RTVNETHNFLFCEFATGFLEYFDMNTDPYQLTNTVHTVERGILNQLHVQLMELRSC
QGYKQCNP RPKNLDVGNKDGGSYDLHRGQLWDGWEG

FIG. 1B

403636301

>human SULF2 full length cDNA (ORF highlighted in capitals)

TGAgactccgcatcccaaaagaagcaccagatcagcaaaaaagaagATGGGCCCCCGAGCCTCGT
GCTGTGCTTGCTGTCCGCAACTGTGTTCTCCCTGCTGGGTGGAAGCTCGGCCTTCCT
GTCGACCAACCGCCTGAAAGGCAGGTTTCAGAGGGACCGCAGGAACATCCGCCCA
ACATCATCCTGGTGCTGACGGACGACCAGGATGTGGAGCTGGGTTCATGCAGGTG
ATGAACAAGACCCGGCGCATCATGGAGCAGGGCGGGGCGCACTTCATCAACGCCTT
CGTGACCACACCCATGTGCTGCCCCCTCACGCTCCTCCATCCTCACTGGCAAGTACGT
CCACAACCACAACACCTACACCAACAATGAGAACTGCTCCTCGCCCTCCTGGCAGGC
ACAGCACGAGAGCCGCACCTTTGCCGTGTACCTCAATAGCACTGGCTACCGGACAGC
TTTCTTCGGGAAGTATCTTAATGAATACAACGGCTCCTACGTGCCACCCGGCTGGAAG
GAGTGGGTGCGACTCCTTAAAAACTCCCGCTTTTATAACTACACGCTGTGTGCGAAGC
GGGTGAAAGAAAAGCACGGCTCCGACTACTCCAAGGATTACCTCACAGACCTCATCA
CCAATGACAGCGTGAGCTTCTTCCGCACGTCCAAGAAGATGTACCCGCACAGGCCAG
TCCTCATGGTCATCAGCCATGCAGCCCCCACGGCCCTGAGGATTCAGCCCCACAAT
ATTCACGCCTCTTCCCAACGCATCTCAGCACATCACGCCGAGCTACAACCTACGCGC
CCAACCCGGACAAACACTGGATCATGCGCTACACGGGGCCCATGAAGCCCATCCACA
TGGAATTCACCAACATGCTCCAGCGGAAGCGCTTGACAGACCCTCATGTGCGGTGGACG
ACTCCATGGAGACGATTTACAACATGCTGGTTGAGACGGGCGAGCTGGACAACACGT
ACATCGTATACACCGCCGACCACGGTTACCACATCGGCCAGTTTGGCCTGGTGAAAG
GGAAATCCATGCCATATGAGTTTGACATCAGGGTCCCGTTCTACGTGAGGGGCCCA
ACGTGGAAGCCGGCTGTCTGAATCCCCACATCGTCCTCAACATTGACCTGGCCCCCA
CCATCCTGGACATTGCAGGCCTGGACATACCTGCGGATATGGACGGGAAATCCATCCT
CAAGCTGCTGGACACGGAGCGGCCGGTGAATCGGTTTCACTTGAAAAAGAAGATGA
GGGTCTGGCGGACTCCTTCTTGGTGGAGAGAGGCAAGCTGCTACACAAGAGAGAC
AATGACAAGGTGGACGCCCAGGAGGAGAACTTTCTGCCCAAGTACCAGCGTGTGAA
GGACCTGTGTGAGCGTGCTGAGTACCAGACGGCGTGAGCAGCTGGGACAGAAGT
GGCAGTGTGTGGAGGACGCCACGGGGAAGCTGAAGCTGCATAAGTGCAAGGGCCC
CATGCGGCTGGGCGGCAGCAGAGCCCTCTCCAACCTCGTGCCCAAGTACTACGGGC
AGGGCAGCGAGGCCTGCACCTGTGACAGCGGGGACTACAAGCTCAGCCTGGCCGG
ACGCCGGAAAAAACTCTTCAAGAAGAAGTACAAGGCCAGCTATGTCCGCAGTCGCTC
CATCCGCTCAGTGGCCATCGAGGTGGACGGCAGGGTGTACCACGTAGGCCTGGGTG
ATGCCGCCCAGCCCCGAAACCTACCAAGCGGCACTGGCCAGGGGGCCCCTGAGGA
CCAAGATGACAAGGATGGTGGGGACTTCAGTGGCACTGGAGGCCTTCCCGACTACT
CAGCCGCCAACCCCATTAAGTGACACATCGGTGCTACATCCTAGAGAACGACACAG
TCCAGTGTGACCTGGACCTGTACAAGTCCCTGCAGGCCTGGAAAGACCACAAGCTG
CACATCGACCACGAGATTGAAACCCTGCAGAACAAAATTAAGAACCTGAGGGGAAGTC
CGAGGTACCTGAAGAAAAAGCGGCCAGAAGAATGTGACTGTCACAAAATCAGCTAC
CACACCCAGCACAAAGGCCGCCTCAAGCACAGAGGCTCCAGTCTGCATCCTTTCAG
GAAGGGCCTGCAAGAGAAGGACAAGGTGTGGCTGTTGCGGGAGCAGAAGCGCAAG
AAGAACTCCGCAAGCTGCTCAAGCGCCTGCAGAACAACGACACGTGCAGCATGCC
AGGCCTCACGTGCTTCACCCACGACAACCAGCACTGGCAGACGGCGCCTTTCTGGA
CACTGGGGCCTTTCTGTGCCTGCACCAGCGCCAACAATAACACGTACTGGTGCATGA
GGACCATCAATGAGACTCACAATTTCTTCTGTGAATTTGCAACTGGCTTCCTAGA
GTACTTTGATCTCAACACAGACCCCTACCAGCTGATGAATGCAGTGAACACACTGGAC
AGGGATGTCTCAACCAGCTACACGTACAGCTCATGGAGCTGAGGAGCTGCAAGGGT
TACAAGCAGTGTAAACCCCGGACTCGAAACATGGACCTGGGACTTAAAGATGGAGGA
AGCTATGAGCAATACAGGCAGTTTCAGCGTCGAAAGTGGCCAGAAATGAAGAGACCT
TCTTCAAATCACTGGGACAACGTGTGGGAAGGCTGGGAAGGTTAgaacaacagaggtgg

FIG. 2A i

acctcaaaaacatagaggcatcacctgactgcacaggcaatgaaaaacatgtgggtgattccagcagacctgtgctat
tggccaggaggcctgagaaagcaagcacgcactctcagtcaacatgacagattctggaggataaccagcaggagcaga
gataacttcaggaagtccattttgcccctgcttttgcttgattatacctcaccagctgcacaaaatgcatttttcgtatcaaaa
agtcaccactaaccctccccagaagctcacaaggaaaacggagagagcgagcgagagagattccttgaaatttctc
ccaagggcgaaagtcattggaatttttaaatcataggggaaaagcagtcctgttctaaatcctctattcttttggttgtcacaaa
gaaggaactaagaagcaggacagaggcaacgtggagaggctgaaaacagtcagagacgttgacaatgagtcagta
gcacaaaagagatgacatttacctagcactataaaccttggtgcctctgaagaaactgccttcattgtatatgtgactattta
catgtaatcaacatgggaacttttaggggaacctataagaaatcccaattttcaggagtgggtggtcaataaacgctctgtg
gccagtgtaaaagaaaaaaaaaaaaaaaaa

FIG. 2A ii

FIG. 2A ii

>human SULF2 amino acid sequence--translation of ORF
MGPPSLVLCLLSATVFSLLGGSSAFLSHHRLKGRFQRDRRNIRPNILVLTDDQDVELGSM
QVMNKTRRIMEQGGAHFINAFVTTMCCPSRSSILTGKYVHNHNTYTNNENCSSPSWQ
AQHESRTFAVYLNSTGYRTAFFGKYLNEYNGSYVPPGWKEWVGLLKNSRFYNYTLCRN
GVKEKHGSDYSKDYLTDLITNDSVSFFRTSKKMYPHRPVLMVISHAAPHGPEDSAPQYS
RLFPNASQHITPSYNYAPNPDKHWIMRYTGPMKPIHMEFTNMLQKRRLQTLMSVDDSMET
TIYNMLVETGELDNTYIVYTADHGYHIGQFGLVKGKSMPYEFDIRVPPFYVRGPNVEAGCL
NPHIVLNIDLAPTILDIAGLDIPADMDGKSILKLLDTERPVNRFHLKKKMRVWRDSFLVERG
KLLHKRDNDKVDAQEENFLPKYQRVKDLQRAEYQTACEQLGQKWQCVEDATGKLLKH
KCKGPMRLGGSRALSNLVPKYYGQGSEACTCDSGDYKLSLAGRRKKLFKKKYKASYVR
SRSIRSV AIEVDGRVYHVGLGDAAQPRNLTKRHWP GAPEDQDDKDGGDFSGTGGLPDY
SAANPIKVTHRCYILENDTVQCDLDLYKSLQAWKDHKLHIDHEIETLQNKIKNLREVRGHL
KKKRPEECDCHKISYHTQHKGRCLKHRGSSLHPFRKGLQEKDQVWLLREQKRKKKLRKLL
KRLQNNDTCSMPGLTCFTHDNQHWQTAPFWTLGPFCACTSANNNTYWCMRTINETHN
FLFCEFATGFLEYFDLNTDPYQLMNAVNTLDRDVLNQLHVQLMELRSCKGYKQCNPRTR
NMDLGLKDGGSYEQYRQFQRRKWPEMKRPSSKSLGQLWEGWEG

FIG. 2B

FIG. 2B

>mouse SULF1 full length cDNA (ORF fragments highlighted in capitals)
cttcaccttgagaaggtgaattccctaaagacatgcagtttctcaagccagaatccttgagggaaccttcaaaggactcctt
ctgcagatgttttgaaacctctgagctagaaatcgattattcaccaggataccttattcaagctcccagaactcaccgacc
aaggagcttggaagactttgcaactttgaccaagcacaATGAAGTATTCCCTCTGGGCTCTGCTGCTT
CCCCTGCTGGGCACACAGCTGCTGGGAACCCTGTGTTCCACCGTTCCGGTCCCAGAG
GTTCCGAGGAAGGATACAGCAGGAACGAAAAACATCCGACCCAACATTATTCTTGTG
CTTACCGATGATCAAGATGTGGAGCTGGGGTCCCTGCAAGTCATGAACAAAACGAGA
AAGATTATGGAACATGGGGGGGGCCACCTTCATCAATGCCTTTGTGACTACACCCATGT
GCTGCCCGTCACGGTCTCCATGCTCACCGGGAAGTATGTGCACAATCACAATGTCT
ACACCAACAACGAGAAGTCTCTTCCCCCTCGTGGCAGGCCATGCATGAGCCTCGG
ACTTTTGCTGTATATCTTAACAACACTGGCTACAGAACAGCCTTTTTTGGAAAATACCT
CAATGAATATAATGGCAGCTACATCCCCCTGGGTGGCGAGAATGGCTTGGATTAATC
AAGAATTCTCGTTTCTATAATTACACTGTTTGTGCAATGGCATCAAAGAAAAGCATGG
ATTTGATTATGCAAAGGACTACTTCACAGACTTAATCACTAACGAGAGCATTAACTACTT
CAAAATGTCTAAGAGAATGTATCCCCATAGGCCCGTTATGATGGTGATCAGCCACGCT
GCGCCCCACGGCCCCGAGGACTCAGCCCCACAGTTTTTCTAAACTGTACCCCAATGCT
TCCCAACACATAACTCCTAGTTATAACTATGCACCAAATATGGATAAACACTGGATTATG
CAGTACACAGGACCAATGCTGCCATCCACATGGAATTTACAAACATTCTACAGCGCA
AAAGGCTCCAGACTTTTGATGTCAGTGGATGATTCTGTGGAGAGGCTGTATAACATGCT
CGTGGAGACGGGGGAGCTGGAGAATACTTACATCATTTACACCGCCGACCATGGTTA
CCATATTGGGCAGTTTGGACTGGTCAAGGGGAAATCCATGCCATATGACTTTGATATTC
GTGTGCCTTTTTTTTATTCTGTTTCCAAGTGTAGAACCAGGATCAATAGTCCCACAGATC
GTTCTCAACATTGACTTGGCCCCACGATCCTGGATATTGCTGGGCTCGACACACCTC
CTGATGTGGACGGCAAGTCTGTCTCAAACCTTCTGGACCCAGAAAAGCCAGGTAACA
GGTTTTCGAACAAACAAGAAGGCCAAAATTTGGCGTGATACATTCCTAGTGGAAGAGG
CAAATTTCTACGTAAAGAAGGAAGAATCCAGCAAGAATATCCAACAGTCAAATCACTTGC
CCAATATGAACGGGTCAAAGAAGTATGCCAGCAGGCCAGGTACCAGACAGCCTGTG
AACAAACCGGGGCAGAAGTGGCAATGCATTGAGGATACATCTGGCAAGCTTCGAATTC
ACAAGTGTAAGGACCCAGTGACCTGCTCACAGTCCGGCAGAGCACGCGGAACCTC
TACGCTCGCGGCTTCCATGACAAAGACAAAGAGTGCAGTTGTAGGGAGTCTGGTTAC
CGTGCCAGCAGAAGCCAAAGAAAGAGTCAACGGCAATTCTTGAGAAACCAGGGGAC
TCCAAAGTACAAGCCCAGATTTGTCCATACTCGGCAGACACGTTCTTGTCCGTCGAA
TTTGAAGGTGAAATATATGACATAAATCTGGAAGAAGAAGAAGATTGCAAGTGTTGCA
ACCAAGAAACATTGCTAAGCGTCATGATGAAGGCCACAAGGGGGCCAAGAGATCTCCA
GGCTTCCAGTGGTGGCAACAGGGGCAGGATGCTGGCAGATAGCAGCAACGCCGTGG
GCCACCTACCACTGTCCGAGTGACACACAAGTGTTTTATTCTTCCCAATGACTCTATC
CATTGTGAGAGAGAACTGTACCAATCGGCCAGAGCGTGGAAGGACCATAAGGCCTAC
ATTGATAAAGAGATTGAAGTTCTACAAGATAAAATTAAGAATTTAAGGGAAGTGAGGGG
ACACCTAAAGAAAAGGAAACCTGAGGAGTGTAGCTGTGGTGACCAGAGCTATTACAA
CAAAGAGAAAAGGTGTCAAACGACAGGAGAAGCTAAAGAGTCACCTTCACCCCTTCAA
GGAGGCTGCTGCCAGGAGGTGGATAGCAAACCTTCAGCTCTTCAAGGAGCATCGGA
GGAGGAAGAAGGAGAGGAAGGAGAAGAAACGGCAGAGGAAGGGAGAGGAGTGTAG
CCTGCCTGGCCTTACCTGCTTCACCCATGACAACAACCACTGGCAGACTGCCCCATT
CTGGAACCTTGGGATCTTTCTGTGCCTGCACAAGTTCTAACAACAATACCTACTGGGTG
TTGCGTACAGTCAACGAGACGCACAATTTCTGTTTTGTGAGTTTGCTACTGGCTTTC
TGGAATATTTGACATGAATACGGATCCTTATCAGCTCACAAATACAGTACACACAGTA

FIG. 3A i

GAACGAGGCATTTTGAATCAGCTACACGTACAACCTAATGGAGCTCAGAAGCTGTCA
AGGATATAAGCAGTGCAACCCAAGACCTAAGAATCTTGATGTTGGAAATAAAGATG
GAGGAAACTATGACCCGACAGAGGACAGTTATGGGATGGATGGGAAGGTTAGTC
TTTCCAATGTTACTTCAGACACCAGCTGGCAAGGCCTGGAGGAGTTATCCGGTGC
AAGCGACATCGATGAGTACAGGTCTAACCCTAGACTAAGTCTGGAGGACTGGACT
AACTACCTGAGGGCTGTCTACAGAGCCTTTGCACTGCTGAACAGTCACCCTGATC
CAAACAAAGCAAATGGGACTCCAACCACACAAGGTGGTGACTTCCTGGTCACCTC
TGCTGAGCGCTTGGTGCCAGCAGAGATGGCTTCTGCAGAATCAGGTGAAGACCC
AAGTCATGTGGTTGGGGAAACACCTCCTTTGACCTTGCCAGTCAACCTCCAAACC
CTGCATCTGAACAGACCAACGTTAAGTCCAGAGAGAAAACCTTGAATGGGATAATGA
CATTCCAGAAGTGAATCATTTGAATTCTGAACACTGGAGAAAAACTGAGAAGCAGA
TAGGATGGGAGGAGCTGCATCATCCTGAAGGTGACGTCGTCAGTGGCAATGGTAT
GACAGAGCTGCTGCCCCAGTCTCATCTTGGGCATCAGCTCACCAGTCAGCACCA
ACAAAAATGTTCCCAGGATGTGGAGACAGAGAAGGATGCTTTTGAAGATCAATTG
CGTCCTCTTGTCCTACTCTGACAGAACTCCGGTTCATC

FIG. 3A ii

102566 9962001

>mouse SULF1 amino acid sequence--translation of ORF
MKYSLWALLLP LLGTQLLGTL CSTVRSQRFRGRIQQERKNIRPNILVLTDDQDVELGS
LQVMNKTRKIMEHGGATFINAFVTTPMCPSRSSMLTGKYVHNHNVYTNNENCSSP
SWQAMHEPRTFAVYLNNTGYRTAFFGKYLNEYNGSYIPPGWREWLG LIKNSRFYNY
TVCRNGIKEKHGFDYAKDYFTDLITNESINYFKMSKRMYPHRPVMMVISHAAPHGPE
DSAPQFSKLYPNASQHITPSYNYAPNMDKHWIMQYTG PMLPIHMEFTNILQRKRLQT
LMSVDDSVRLYNMLVETGELENTYIIYTADHG YHIGQFGLVKGKSMPYDFDIRVPFFI
RGPSVEPGSIVPQIVLNIDLAPTILDIAGLDTPPDVDGKSVLKLLDPEKPGNRFRTNKK
AKIWRDTFLVERGKFLRKKEESSKNIQQSNHLPKYERVKELCQQARYQTACEQPGQ
KWQCIEDTSGKLRIHKCKGPSDLLTVRQSTRNLYARGFHDKDKECSCRESGYRASR
SQRKSQRQFLRNQGT PKYKPRFVHTRQTRSL SVEFEGEYDINLEEEEEELQVLQPRN
IAKRHDEGHKGPRDLQASSGGNRGRMLADSSNAVG PPTTVRVTHKCFILPND SIHCE
RELYQSARAWKDHKAYIDKEIEVLQDKIKNLREVRGHLKKRKPEECSCGDQSYYNKE
KGVKRQEKLKSHLHPFKEAAAQEVDSKLQLFKEHRRRKKERKEKKRQRKGEECSLP
GLTCFTHDNNHWQTAPFWNLGSFCACTSSNNNTYWVLRTVNETHNFLFCEFATGFL
EYFDMNTDPYQLTNTVHTVERGILNQLHVQLMELRSCQGYKQCNP RPKNLDVGNKD
GGNYDPHRGQLWDGWEG

FIG. 3B

1005966-42344

>mouse SULF-2 cDNA (ORF in capital letters)

ggacgcgtgggacgcgcgtggggtctgggcaacgcttctgcttgccttgagctcaactaatttctcagagagcttcgg
agacgcgtgggaaggtcccaggcgctgggagcttctcccgcatctagctggggatcgggccgagccggcgctctc
caatgatcctgaggggaagaggggaaggaatcccatcctcacgacaccacctcgccctctgcatccaggaagaagca
aaggaccagcaagccacgccaATGGCACCCCCCTGGCCTGCCACTATGGCTGCTGTCCAC
CGCTCTCCTCTCCCTGCTGGCTGGCAGCTCGGCCTTCTCTCCCATCCCCGCCT
GAAGGGACGCTTCCAGAGGGACCGCAGGAACATCCGGCCCCAACATCATCTTGGT
GCTTACGGATGACCAGGATGTGGAGCTGGGCTCCATGCAAGTGATGAACAAGACA
AGGCGTATCATGGAGCAGGGCGGGGCGCACTTCATCAATGCCTTCGTGACTACAC
CAATGTGCTGTCCGTCTCGCTCCTCCATTCTCACC GGCAAGTACGTCCACAACCA
CAACACCTACACCAACAATGAGAATTGTTCTCGCCCTCCTGGCAGGCCCCAGCAC
GAGAGCCGCACCTTCGCCGTGTATCTCAACAGCACAGGCTACCGGACAGCTTTCT
TCGGAAAATACCTCAATGAGTACAACGGCTCATACGTGCCGCCCGGCTGGAAGGA
GTGGGTGCGCCTACTTAAGAACTCCCGCTTTTATAACTACACACTCTGCCGGAATG
GGGTGAAGGAGAAACATGGCTCAGACTACTCCACGGATTACCTCACGGATCTCAT
CACCAATGACAGTGTGAGCTTCTTCCGAACATCCAAGAAGATGTACCCACACAGG
CCCGTGCTCATGGTCATCAGCCACGCGGCTCCCCACGGCCCCGAGGACTCGGC
ACCGCAGTACTCACGGCTCTTCCCCAATGCGTCCCAGCACATCACACCGAGTTAC
AACTATGCACCCCAACCCAGACAAGCATTGGATCATGCGCTACACGGGACCCATGA
AGCCCATTCACATGGAATTCACCAACATGCTACAACGCAAACGCCTACAGACCCTC
ATGTCTGTGGATGACTCCATGGAGACGATCTATGACATGCTGGTGGAGACGGGGG
AGCTGGACAACACGTACATCCTGTACACCGCCGACCACGGCTACCACATTGGCCA
GTTTGGGCTGGTGAAGGGCAAGTCTATGCCGTATGAATTCGACATCAGAGTCCCG
TTCTACGTGAGGGGGCCCCAACGTGGAAGCTGGCTCTCTGAACCCCCACATTGTC
CTCAACATTGACCTGGCCCCCACCATACTGGATATCGCTGGACTGGACATCCCTG
CAGACATGGACGGGAAGTCTATTCTCAAACACTACTGGACTCAGAGCGGCCAGTGAA
CCGGTTCCACTTGAAAAAGAAGCTGAGGGTCTGGCGAGACTCCTTCCTGGTGGA
GAGAGGCCAACTGCTCCACAAGAGGGAGGGTGACAAAGTGAATGCCCAGGAGGA
GAACTTCCTGCCCAAGTACCAGCGCGTGAAGGACCTGTGTGTCAGCGAGCTGAGTA
CCAGACAGCATGCGAACAGCTGGGGCAGAAGTGGCAGTGTGTGGAGGACGCTT
CTGGGACGCTGAAGCTGCACAAATGTAAAGGCCCCATGCGGTTTGGTGGCGGCG
GTGGCAGCAGAGCCCTCTCCAACCTGGTGCCCAAGTATGACGGCCAGAGCAGCG
AGGCCTGCAGCTGTGACAGTGGCGGTGGAGGGGACTACAACTGGGCCTGGCT
GGACGCCGTAAGCTCTTTAAGAAAAAGTATAAGACCAGCTATGCCCGGAACCGCT
CCATCCGTTCCGTGGCCATCGAGGTGGACGGTGAGATATACCACGTAGGCTTGGA
TACTGTGCCTCAGCCCCGCAACCTTAGCAAGCCGCACTGGCCAGGGGGCCCCCTGA
AGACCAAGATGACAAGGATGGTGGCAGTTTCAGTGGTACTGGTGGCCTTCCAGAT
TATTCTGCCCCCAATCCCATCAAAGTGACCCATCGGTGCTACATCCTTGAGAATGA
CACAGTCCAGTGCGACTTGGACCTGTACAAGTCCCTGCAGGCTTGGAAGACCA
CAAGCTGCACATCGACCATGAGATCGAAACCCTGCAGAACAAAATTAAGAACCTTC
GAGAAGTCAGGGGTACCTGAAGAAGAAGCGACCGGAAGAATGTGACTGCCATA
AAATCAGTTACCACAGCCAACACAAAGGCCGTCTCAAGCACAAAGGCTCCAGCCT
GCACCCTTTCAGGAAGGGTCTGCAGGAGAAGGACAAGGTGTGGCTGCTGCGGG
AGCAGAAACGCAAGAAGAACTGCGCAAGCTGCTCAAACGGCTGCAGAACAACG
ATACGTGCAGCATGCCCGGCCTCACGTGCTTTACCCACGACAACCACCACTGGCA
GACGGCGCCACTCTGGACGCTGGGGCCGTTCTGCGCCTGCACCAGCGCCAACA
ACAACACGTACTGGTGCTTGAGGACCATAAATGAGACCCACAACCTTCCTTCTG
GAATTTGCAACCGGCTTCATAGAATACTTTGACCTCAGTACAGACCCCTACCAGCT
GATGAACGCGGTGAACACACTGGACAGGGACGTCTTAACCAACTGCACGTGCA
GCTCATGGAGCTAAGGAGCTGTAAAGGCTACAAGCAGTGCAACCCCCGGACCCG
CAACATGGACCTGGGGCTTAGAGACGGAGGAAGCTATGAACAATACAGGCAGTTT
CAGCGTCGAAAATGGCCAGAAATGAAGAGACCTTCTTCCAAATCACTGGGACAGC
TATGGGAAGGTTGGGAAGGCTAAgcgccatagagagaggaaacctccaaaaccaggggcctcgtgtg

FIG. 4Ai

gctgcccaggccatgcaaaaaacacccgattcccagaagatgaatgttggaactgggagacctgacagaaggcagg
gctgctctgggacaggaaatcctggaggacagcgctggactttccgatgctcagtttcttgccctgcttgctctggatca
aacctcactggctgctctgggatgcgtgctcacacctggagtgctcacccttcagaggctcacaagacaaagga
actaatttccatggacacttctccagagatggaaattgctgggattcgccactcctcccctgcacccctccccagtc
ctagggaagcaagctgttttaaccttcttactcttggagaaagcacggacatcccagggtgctgtcaacctcacagtc
caaagtctatagcacaacacagtaccattcaccagggtggtgacctggctggctcagaagctgccttcaccacatacat
gaccgctcacacgtaaccaacacagggaattgtaggggaatctcactaatatgaaatcccgcctttcaagagtcgcggtg
tcaataaacgctgtggctaggatcaaggataatccctgagcttcagacatttctcctgccgggattcggttccttgtatcc
atcccagaactgatgttttctaagggtaccgaaacccaagtgtatgtgtctgtgttttaatgacattgtattgtaaagttt
gtagtataagtaccatcttacagttcctgccccagccaatgtctagctattggtatgaaaaaaaaaattcttgaattttg
taaaaaaaaaaaaaa

FIG. 4A ii

FIG. 4B

[illegible]

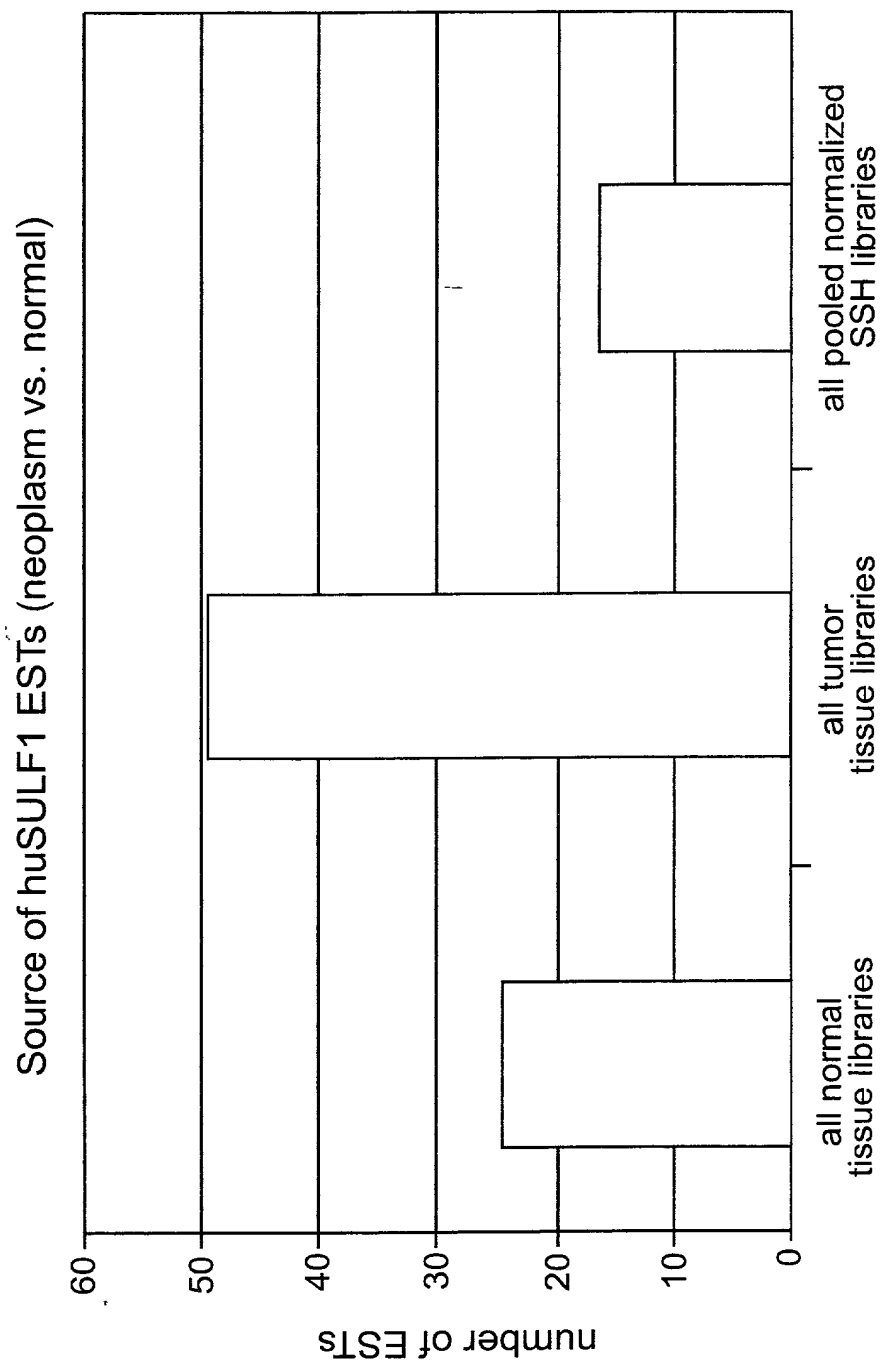


FIG. 5

Source of huSULF1 ESTs (detailed)

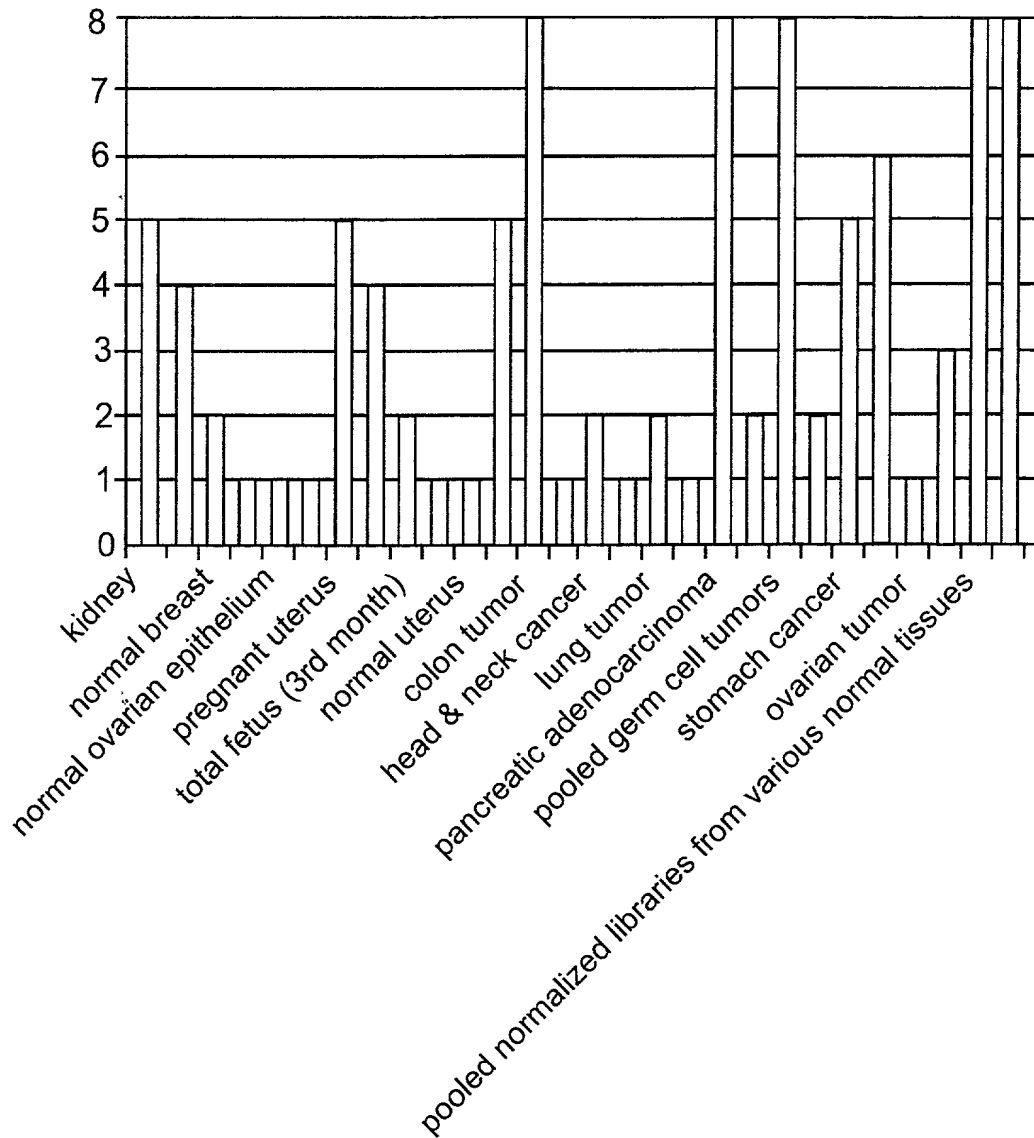


FIG. 6

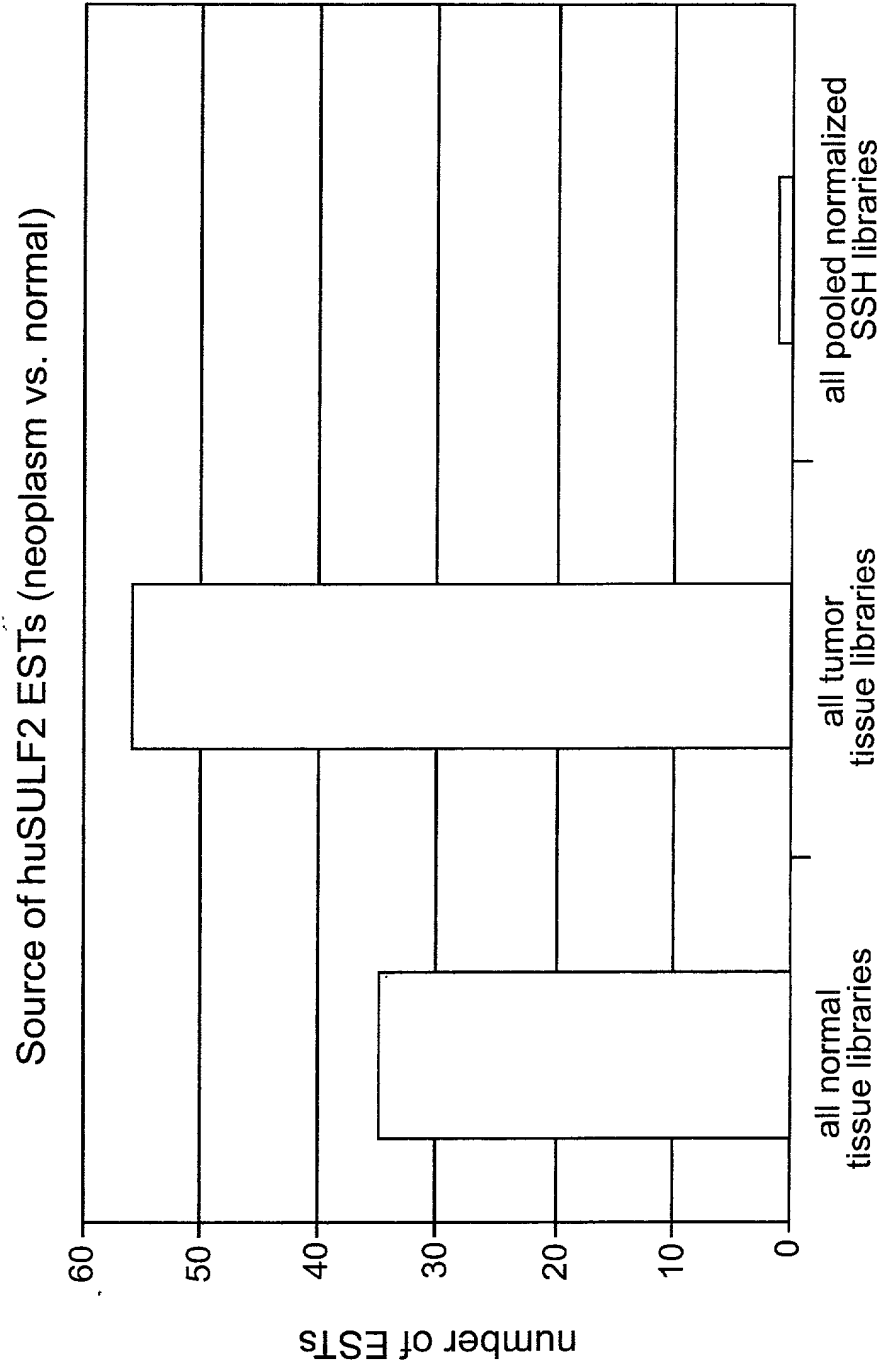


FIG. 7

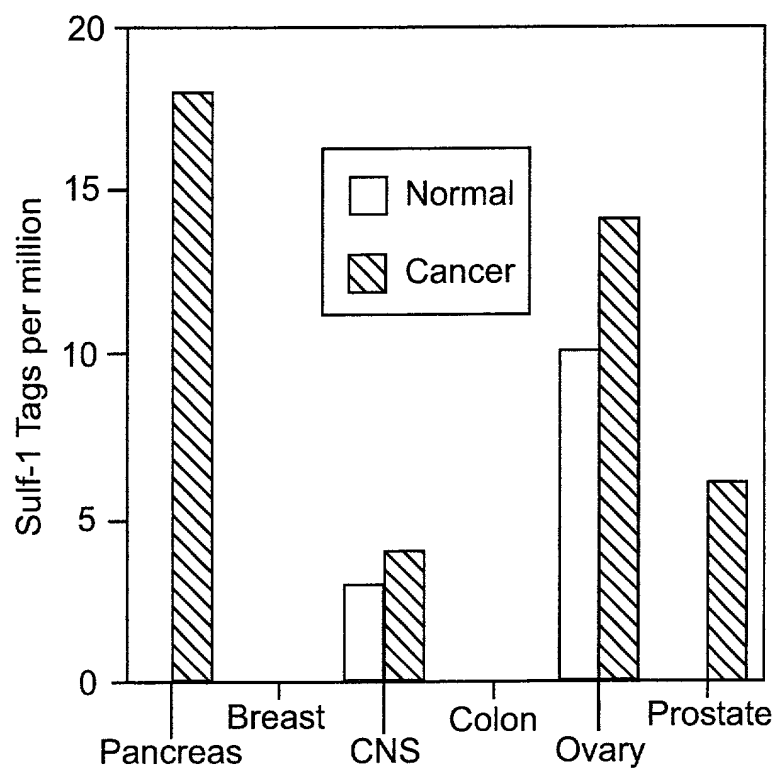


FIG. 8

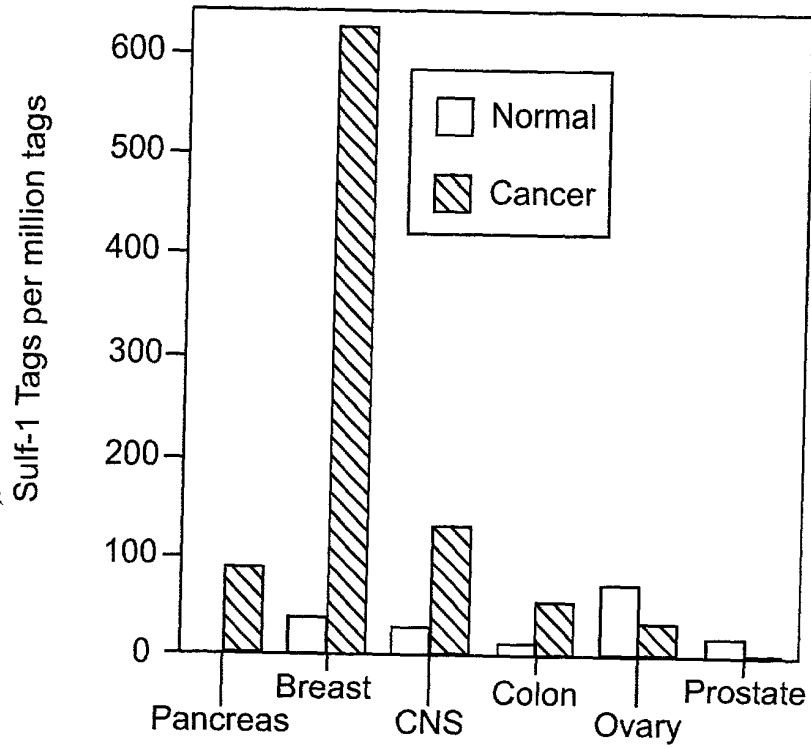


FIG. 9

> human SULF2 full length cDNA (ORF is highlighted in capitals and a 5' inframe stopcodon is underscored)

ggcacgagggccatttctggacaacagctgctattttcaacttgagcccaagttaatttctcggggagtttctcgggcgcgcac
ggcagctcggttggccctgcgattgagctgcgggtcgcgccggcgccggcctctccaatggcaaagtgtgtggctggag
gcgagcgcgaggcttccggcaaaggcagtcgagtggttcgagaccggggcgagtcctgtgaaagcagataaaagaaaa
catttattaacgtgtcattacgagggggagcgcccgccggggctgtcgactccccgcggaacatttggctccctccagctc
ctagagaggagaagaagaaagcggaagagggcagattcacgtcgtttccagccaagtggacctgatcgatggccctc
ctgaatttatcacgatatttgatttattagcgatgccccctggttgtgtgttacgcacacacacgtgcacacaaggctctggctc
gttccctccctcgtttccagctcctggcgaaatccacatctgtttcaactctccgcccaggggcgagcaggagcgagagtg
gtcgaatctgcgagtgaaagaggagcaggggaaaagaaacaaagccacagacgcaacttgagactcccgcatcccaa
aagaagcaccagatcagcaaaaaaagaagATGGGCCCCCCGAGCCTCGTGCTGTGCTTGCTG
TCCGCAACTGTGTTCTCCCTGCTGGGTGGAAGCTCGGCCTTCCTGTGCGACCAACC
GCCTGAAAGGCAGGTTTTCAGAGGGACCGCAGGAACATCCGCCCAACATCATCCTG
GTGCTGACGGACGACCAGGATGTGGAGCTGGGTTCATGCAGGTGATGAACAAGA
CCCGGCGCATCATGGAGCAGGGCGGGGCGCACTTCATCAACGCCTTCGTGACCAC
ACCCATGTGCTGCCCCCTCACGCTCCTCCATCCTCACCGGCAAGTACGTCCACAACC
ACAACACCTACACCAACAATGAGAAGTCTCCTCGCCCTCCTGGCAGGCACAGCAC
GAGAGCCGCGACCTTTGCCGTGTACCTCAATAGCACTGGCTACCGGACAGCTTTCTT
CGGGAAGTATCTTAATGAATACAACGGCTCCTACGTGCCACCCGGCTGGAAGGAGT
GGGTGCGACTCCTTAAAACTCCCGCTTTTATAACTACACGCTGTGTGGAACGGGG
TGAAAGAGAAGCACGGCTCCGACTACTCCAAGGATTACCTCACAGACCTCATCACC
AATGACAGCGTGAGCTTCTTCCGCGACGTCCAAGAAGATGTACCCGCGACAGGCCAGT
CCTCATGGTCATCAGCCATGCAGCCCCCAGGCCCTGAGGATTCAGCCCCACAAT
ATTCACGCCTCTTCCCAAACGCATCTCAGCACATCACGCCGAGCTACAACCTACGCGC
CCAACCCGGACAAACACTGGATCATGCGCTACACGGGGCCCATGAAGCCCATCCAC
ATGGAATTCACCAACATGCTCCAGCGGAAGCGCTTGAGACCCTCATGTGCGGTGGA
CGACTCCATGGAGACGATTTACAACATGCTGGTTGAGACGGGGCGAGCTGGACAACA
CGTACATCGTATACACCGCCGACCACGGTTACCACATCGGCCAGTTTGGCCTGGTG
AAAGGGAAATCCATGCCATATGAGTTTGACATCAGGGTCCCCTTCTACGTGAGGGGC
CCCAACGTGGAAGCCGGCTGTCTGAATCCCCACATCGTCTCAACATTGACCTGGC
CCCCACCATCCTGGACATTGCAGGCCTGGACATACCTGCGGATATGGACGGGAAAT
CCATCCTCAAGCTGCTGGACACGGAGCGGCCGGTGAATCGGTTTCACTTGAAAAAG
AAGATGAGGGTCTGGCGGGACTCCTTCTTGGTGGAGAGAGGCAAGCTGCTACACA
AGAGAGACAATGACAAGGTGGACGCCAGGAGGAGAACTTTCTGCCCAAGTACCA
GCGTGTGAAGGACCTGTGTCAGCGTGCTGAGTACCAGACGGCGTGAGCAGCTG
GGACAGAAGTGGCAGTGTGTGGAGGACGCCACGGGGAAGCTGAAGCTGCATAAGT
GCAAGGGCCCCATGCGGCTGGGCGGCAGCAGAGCCCTCTCCAACCTCGTGCCCA
AGTACTACGGGCAGGGCAGCGAGGCCTGCACCTGTGACAGCGGGGACTACAAGCT
CAGCCTGGCCGGACGCCGGAACAACTCTTCAAGAAGAAGTACAAGGCCAGCTATG
TCCGCAGTCGCTCCATCCGCTCAGTGGCCATCGAGGTGGACGGCAGGGTGTACCA
CGTAGGCCTGGGTGATGCCGCCAGCCCCGAAACCTCACCAAGCGGCACTGGCCA
GGGGCCCCCTGAGGACCAAGATGACAAGGATGGTGGGGACTTCAGTGGCACTGGAG
GCCTTCCCGACTACTCAGCCGCCAACCCCATTAAGTGACACATCGGTGCTACATCC
TAGAGAACGACACAGTCCAGTGTGACCTGGACCTGTACAAGTCCCTGCAGGCCTGG
AAAGACCACAAGCTGCACATCGACCACGAGATTGAAACCCTGCAGAACAAAATTAAG
AACCTGAGGGAAGTCCGAGGTACCTGAAGAAAAAGCGGCCAGAAGAATGTGACT
GTCACAAAATCAGCTACCACACCCAGCACAAAGGCCCGCTCAAGCACAGAGGCTCC
AGTCTGCATCCTTTTCAGGAAGGGCCTGCAAGAGAAGGACAAGGTGTGGCTGTTGC
GGGAGCAGAAGCGCAAGAAGAACTCCGCAAGCTGCTCAAGCGCCTGCAGAACAA

FIG. 10A i

1005966-1-101

CGACACGTGCAGCATGCCAGGCCTCACGTGCTTCACCCACGACAACCAGCACTGG
CAGACGGCGCCTTTCTGGACACTGGGGCCTTTCTGTGCCTGCACCAGCGCCAACA
ATAACACGTACTGGTGCATGAGGACCATCAATGAGACTCACAATTTCTCTTCTGTG
AATTTGCAACTGGCTTCCTAGAGTACTTTGATCTCAACACAGACCCCTACCAGCTGA
TGAATGCAGTGAACACACTGGACAGGGATGTCCTCAACCAGCTACACGTACAGCTC
ATGGAGCTGAGGAGCTGCAAGGGTTACAAGCAGTGTAACCCCCGGACTCGAAACA
TGGACCTGGGACTTAAAGATGGAGGAAGCTATGAGCAATACAGGCAGTTTCAGCGT
CGAAAGTGGCCAGAAATGAAGAGACCTTCTTCCAAATCACTGGGACAACGTGTTGGG
AAGGCTGGGAAGGTTAAgaaacaacagaggtggacctccaaaaacatagaggcatcacctgactgcacag
gcaatgaaaaaccatgtgggtgatttccagcagacctgtgctattggccaggaggcctgagaaagcaagcagcactct
cagtcaacatgacagattctggaggataaccagcaggagcagagataacttcaggaagtccattttgcccctgctttgct
ttggattatacctcaccagctgcacaaaatgcatttttcgtatcaaaaagtcaccactaacctccccagaagctcacia
aggaaaaacggagagagcgcagcgcagagagatttcttgaaatttctcccaaggcgaaagtcattggaattttaaatca
taggggaaaagcagtcctgttctaaatccttattctttgggttgcacaaagaaggaaactaagaagcaggacagaggc
aacgtggagaggctgaaaacagtcagagacgtttgacaatgagtcagtagcacaaaagagatgacatttacctagca
tataaacctggttgctctgaagaaactgccttcattgtatatagtgactattacatgtaataacatgggaacttttagggg
aacctaataagaaatccaatttccaggagtgggtgtgcaataaacgctctgtggccagtgtaaaagaaaaaaaaaaa
aaattgtggacatttctgttctgtccagataccatttctcctagatttcttgttatgtcccagaactgatgttttttaaggctact
gaaaagaaatgaagtgtatgtcccaagtttgatgaaactgtattgtaaaaaaattttgtagtttaagtattgtcataca
gtgttcaaaaccccgccaatgaccagcagttggatgaagaaccttgacattttgtaaaaggccatttctggggaaaaa
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

FIG. 10A ii

>human SULF2 protein (translation of ORF)

MGPPSLVLCLLSATVFSLLGGSSAFLSHHRLKGRFQRDRRNIRPNILVLTDDQDVELGS
MQVMNKTRRIMEQGGAHFINAFVTTPMCPSRSSILTGKYVHNHNTYTNNENCSSPS
WQAQHEsrTFAVYLNSTGYRTAFFGKYLNEYNGSYVPPGWKEWVGLLKNSRFYNYTL
CRNGVKEKHGSDYSKDYLTDLITNDSVSFFRTSKKMYPHRPVLMVISHAAPHGPEDSA
PQYSRLFPNASQHITPSYNYAPNPDKHWIMRYTGPMKPIHMEFTNMLQRKRLQTLMSV
DDSMETIYNMLVETGELDNTYIVYTADHGYHIGQFGLVKGKSMPYEFDIRVPFYVRGPN
VEAGCLNPHIVLNIDLAPTILDIAGLDIPADM DGKSILKLLDTERPVNRFHLKKKMRVWRD
SFLVERGKLLHKRDNDKVDAQEENFLPKYQRVKDL CQRAEYQTACEQLGQKWQCVED
ATGKLKLHKCKGPMRLGGSRALSNLVPKYYGQGSEACTCDSGDYKLSLAGRRKKLFKK
KYKASYVRSRSIRSVAIEVDGRVYHVGLGDAAQPRNLTKRHWPGAPEDQDDKDGGDF
SGTGGLPDYSAANPIKVTHRCYILENDTVQCDLDLYKSLQAWKDHKLHIDHEIETLQNKI
KNLREVRGHLKKKRPEECDCHKISYHTQHKGRCLKHRGSSLHPFRKGLQEKD K VWLLR
EQKRKKKLRKLLKRLQNNDTCSMPGLTCFTHDNQHWQTAPFWTLGPFCACTSANNNT
YWCMRTINETHNFLCFEATGFLEYFDLNTDPYQLMNAVNTLDRDVLNQLHVQLMELR
SCKGYKQCNPRTRNMDLGLKDGGSYEQYRQFQRRKWPEMKRPSSKSLGQLWEGWE
G

FIG. 10B

406596-1304
Total 99500

>mouse SULF2 full length cDNA (ORF highlighted in capitals)

ggcggcggagatcctgagggagaggggaaggaatccccatcctcagcacaccacctcggcctctgcatccaggaagaa
gcaaaggaccagcaagccacgccaATGGCACCCCCTGGCCTGCCACTATGGCTGCTGTCCAC
CGCTCTCCTCTCCCTGCTGGCTGGCAGCTCGGCCTTCCTCTCCCATCCCCGCCTGA
AGGGACGCTTCCAGAGGGACCGCAGGAACATCCGGCCCCAACATCATCTTGGTGCTT
ACGGATGACCAGGATGTGGAGCTGGGCTCCATGCAAGTGATGAACAAGACAAGGCG
TATCATGGAGCAGGGCGGGGCGCACTTCATCAATGCCTTCGTGACTACACCAATGTG
CTGTCCGTCTCGCTCCTCCATTCTCACCGGCAAGTACGTCCACAACCACAACACCTA
CACCAACAATGAGAATTGTTCTCGCCCTCCTGGCAGGCCCCAGCACGAGAGCCGCA
CCTTCGCCGTGTATCTCAACAGCACAGGCTACCGGACAGCTTTCTTCGGAAAATACCT
CAATGAGTACAACGGCTCATACGTGCCGCCCGGCTGGAAGGAGTGGGTGGCCTAC
TTAAGAACTCCCGCTTTTATACTACACACTCTGCCGGAATGGGGTGAAGGAGAAACA
TGGCTCGGACTACTCCACGGATTACCTCACGGATCTCATCACCATGACAGTGTGAG
CTTCTTCCGAACATCCAAGAAGATGTACCCACACAGGCCCGTGCTCATGGTCATCAG
CCACGCGGCTCCCCATGGCCCCGAGGACTCAGCACCCCAGTACTCACGGCTCTTCC
CCAATGCGTCCCAGCACATCACACCGAGTTAGAACTATGCACCCAACCCAGACAAGC
ATTGGATCATGCGCTACACGGGACCCATGAAGCCCCATTACATGGAATTCACCAACAT
GCTACAACGAAAACGCCTACAGACCCTCATGTCTGTGGATGACTCCATGGAGACGAT
CTATGACATGCTGGTGGAGACGGGGGAGCTGGACAACACGTACATCCTGTACACCGC
CGACCACGGCTACCACATTGGCCAGTTTGGGCTGGTGAAGGGCAAGTCTATGCCGTA
TGAATTGACATCAGAGTCCCGTTCTACGTGAGGGGGCCCCAACGTGGAAGCTGGCT
CTCTGAACCCCCACATTGTCTCAACATTGACCTGGCCCCCACCATACTGGATATCGC
TGGACTGGACATCCCTGCAGACATGGACGGGAAGTCTATTCTCAAACACTACTGGACTC
AGAGCGGCCAGTGAACCGGTTCCACTTGAAAAAGAAGCTGAGGGTCTGGCGAGACT
CCTTCCTGGTGGAGAGAGGCAAACCTGCTCCACAAGAGGGAGGGTGACAAAGTGAAT
GCCCAGGAGGAGAACTTCCTGCCCAAGTACCAGCGCGTGAAGGACCTGTGTGAGCG
AGCTGAGTACCAGACAGCATGCGAACAGCTGGGGCAGAAAGTGGCAGTGTGTGGAGG
ACGCTTCTGGGACGCTGAAGCTGCACAAATGTAAAGGCCCCATGCGGTTTGGTGGC
GGCGGTGGCAGCAGAGCCCTCTCCAACCTGGTGCCCAAGTATGACGGCCAGAGCA
GCGAGGCCTGCAGCTGTGACAGTGGCGGTGGAGGGGACTACAAACTGGGCCTGGC
TGGACGCCGTAAGCTCTTTAAGAAAAAGTATAAGACCAGCTATGCCCGGAACCGCTC
CATCCGTTCCGTGGCCATCGAGGTGGACGGTGAGATATACCACGTAGGCTTGGATAC
TGTACCTCAGCCCCGCAACCTTAGCAAGCCGCACTGGCCAGGGGGCCCTGAAGACC
AAGATGACAAGGATGGTGGCAGTTTCAGTGGTACTGGTGGCCTTCAGATTATTCTGC
CCCCAATCCCATCAAAGTGACCCATCGGTGCTACATCCTTGAGAATGACACAGTCCAG
TGCGACTTGGACCTGTACAAGTCCCTGCAGGCTTGGAAGACCACAAGCTGCACATC
GACCATGAGATCGAAACCCTGCAGAACAAAATTAAGAACCTTCGAGAAGTCAGGGGT
CACCTGAAGAAGAAGCGACCGGAAGAATGTGACTGCCATAAAATCAGTTACCCACAGC
CAACACAAAGGCCGTCTCAAGCACAAAGGCTCCAGCCTGCACCCTTTCAGGAAGGG
TCTGCAGGAGAAGGACAAGGTGTGGCTGCTGCGGGAGCAGAAACGCAAGAAGAAA
CTGCGCAAGCTGCTCAAACGGCTGCAGAACAAACGATACGTGCAGCATGCCCGGCCT
CACGTGCTTTACCCACGACAACCACTGGCAGACGGCGCCACTCTGGACGCTGG
GGCCGTTCTGCGCCTGCACCAGCGCCAACAACAACACGTACTGGTGCTTGAGGACC
ATAAATGAGACCCACAACCTTCCTCTTCTGCGAATTTGCAACCGGCTTCATAGAATACTT
TGACCTCAGTACAGACCCCTACCAGCTGATGAACGCGGTGAACACACTGGACAGGG
ACGTCCTTAACCAACTGCACGTGCAGCTCATGGAGCTAAGGAGCTGTAAAGGCTACA
AGCAGTGCAACCCCCGGACCCGCAACATGGACCTGGGGCTTAGAGACGGAGGAAG
CTATGAACAATACAGGCAGTTTCAGCGTCGAAAATGGCCAGAAATGAAGAGACCTTCT
TCCAAATCACTGGGACAGCTATGGGAAGGTTGGGAAGGCTAAgcgggccatagagagaggaac

FIG. 11A i

ctccaaaaccaggggcctcgtgtggctgccaggccatgcaaaaaacacccgattcccagaagatgaatgttgaact
gggagacctgacagaaggcagggcctgctcttgggacaggaaatcctggaggacagcgctggacttccgatgctca
gtttctttgccctgcttgcctggaatcaaacctcactggctgctctgggatgcgtgctcacacctggagtctctgctcacccttc
agaggctcacaagacaaaggaactaatttccatggacacttctccagagatggaaattgctgggattcgccactcct
cccctgcacccctccccagtcattaggaagcaagctgttttaaccttcttactcttggagaaagcacggacatcca
ggctgctgaacctcacagcttgacaaagtctatagcacaacacagtgaccattcaccaggctgggtgacctggctggctc
agaagctgccttcaccacatacatgaccgctcacacgtaaccaacacaggaattgtaggggaatctcactaatatgaa
atcccgctttcaagagtcgcggtgtcaataaacgctgtggctaggatcaaggataatcccttgagcttccagacatttattcct
gcccgggattcgcttcttggatccatcccagaactgatgttttctaagggtaccgaaaccccaagttgatgtgtcctgtgttt
aatgacattgtattgtaaagttttagtataagtaccattctacagtggttctgccccagccaatgtctagctattggtatgaa
aaaaaaatctttgaattttgtaaaaaaaaaaaaaaaaa

FIG. 11A ii

FIG. 11A ii

>mouse SULF2 protein (translation of ORF)
MAPPGLPLWLLSTALLSLLAGSSAFLSHPRLKGRFQRDRRNIRPNIILVLTDDQDVELG
SMQVMNKTRRIMEQGGAHFINAFVTTPMCCPSRSSILTGKYVHNHNTYTNNECSS
PSWQAQHESTRFAVYLNSTGYRTAFFGKYLNEYNGSYVPPGWKEWVGLLKNSRFY
NYTLCRNGVKEKHGSDYSTDYLTDLITNDSVSFFRTSKKMYPHRPVLMVISHAAPHG
PEDSAPQYSRLFPNASQHITPSYNYAPNPDKHWIMRYTGPMKPIHMEFTNMLQRKR
LQTLMSVDDSMETIYDMLVETGELDNITYILYTADHGYHIGQFGLVKGKSMPYEFDIRV
PFYVRGPNVEAGSLNPHIVLNIDLAPTILDIAGLDIPADMDGKSILKLLDSERPVNRFHL
KKKLRVWRDSFLVERGKLLHKREGDKVNAQEENFLPKYQRVKDLCQRAEYQTACE
QLGQKWQCVEDASGTLKLHKCKGPMRFGGGGGSRALSNLVPKYDGQSSEACSCD
SGGGGDYKLGLAGRRKLFKKKYKTSYARNRSIRSVAIEVDGEIYHVGLDTPVQPRNL
SKPHWPGAPEDQDDKDGGSFSGTGGLPDYSAPNPIKVTHRCYILENDTVQCDLDLY
KSLQAWKDHKLHIDHEIETLQNKIKNLREVRGHLKKKRPEECDCHKISYHSQHKGRL
KHKGSSLHPFRKGLQEKDKVWLLREQKRKKKLRKLLKRLQNNDTCSMPGLTCFTHD
NHHWQTAPLWTLGPFCACTSANNNTYWCLRTINETHNFLFCEFATGFIEYFDLSTDP
YQLMNAVNTLDRDVLNQLHVQLMELRSCKGYKQCNPRTRNMDLGLRDGGSYEQYR
QFQRRKWPEMKRPSSKSLGQLWEGWEG

FIG. 11B

100596-1310
T.01.22.9952001

FIG. 12

Genomic Organization of huSULF2 gene numbers represent base pairs

| Contig | exon | start | end | length | gap |
|--------------------|------|--------|--------|--------|-------|
| I 159532 | 1 | 66100 | 66668 | 568 | 28587 |
| | 2 | 95255 | 95529 | 274 | 20271 |
| | 3 | 115800 | 116039 | 239 | 34042 |
| | 4 | 150081 | 150232 | 151 | |

>13577

| | | | | | |
|-------------------|---|------|------|-----|--|
| II 2152 | 5 | 1508 | 1677 | 169 | |
|-------------------|---|------|------|-----|--|

>5146

| | | | | | |
|---------------------|----|-------|-------|-----|------|
| III 17546 | 6 | 4672 | 4822 | 150 | 1266 |
| | 7 | 6088 | 6263 | 175 | 4190 |
| | 8 | 10453 | 10581 | 128 | 1543 |
| | 9 | 12124 | 12180 | 56 | 455 |
| | 10 | 12635 | 12764 | 129 | 4101 |
| | 11 | 16865 | 17060 | 195 | |
| | | | | | |

>4971

| | | | | | |
|--------------------|----|-------|-------|-----|------|
| IV 87036 | 12 | 4486 | 4714 | 228 | 308 |
| | 13 | 5022 | 5118 | 96 | 564 |
| | 14 | 5682 | 5776 | 94 | 1010 |
| | 15 | 6786 | 6845 | 59 | 508 |
| | 16 | 7353 | 7522 | 169 | 241 |
| | 17 | 7763 | 7905 | 142 | 1225 |
| | 18 | 9130 | 9253 | 123 | 2043 |
| | 19 | 11296 | 11329 | 33 | 245 |
| | 20 | 11574 | 11627 | 53 | 1007 |
| | 21 | 12634 | 13620 | 986 | |
| | | | | | |

FIG. 12